NOTE XXI.

ON SOME PODOPHTHALMOUS CRUSTACEA, PRESENTED TO THE LEYDEN MUSEUM BY Mr. J. A. KRUYT, COLLECTED IN THE RED SEA NEAR THE CITY OF DJEDDAH.

BY

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The carcinological collections of the Leyden Museum consist, besides of the European types, chiefly of forms from the East Indies and from the Japanese seas, the former being collected by the various travellers of our establishment, the latter being the types of the celebrated work of Mr. de Haan. We cannot therefore be too grateful to have found in Mr. J. A. Kruyt, Dutch Consul at Djeddah, Arabia, a man, who purposes to collect the Fauna of the Red Sea for the Museum. He already has made an interesting beginning, by presenting to us a remarkable collection of fishes and invertebrate animals; it is of the carcinological part of the latter that I may be allowed to say a few words.

1. *Menoethius monoceros* (Latr.) M. Edw.

A male and a female were collected; in the male specimen the tubercles of the upper surface of the carapace are much less developed than in the female.

2. *Actaea nodipes* Heller.

Heller, Sitzungsber. Wiener Akad. Bd. 43, pag. 329.,
Alph. Milne Edwards, Nouv. Archiv. I, pag. 274.

A very fine female specimen was collected at Djeddah, entirely agreeing with the description, given by Heller. Breadth of carapace 19 mm., length 13 mm. The upper surface of the equally sized hands of the chelipedes are provided with tubercular granulated prominences, the outer and lower surfaces are ornamented with minute granules, placed partially in longitudinal rows.

3. *Actaea rufopunctata* M. Edw.

A female *Actaea*, provided with eggs, was in the collection, greatly resembling the above mentioned species; still I hesitate to call our specimen identical with it. Our specimen entirely agrees with the description and the figure of this species, given by Mr. Alph. Milne Edwards (Nouv. Arch. t. I, pag. 268), but it is not of the described size. In our specimen the carapace is only 14 mm. broad and 9 mm. long, while the adult *Actaea rufopunctata* has a size of 40 mm. The carapace is greatly enlarged, convex, and its surface is divided by very large and deep grooves anteriorly as well as posteriorly into a great number of regions; these grooves are covered with a dense pubescence, the upper surface of the carapace being covered with some scattered hairs. The several regions are covered with close granules. The front is very deflexed, somewhat emarginate in the middle, but for the rest little prominent. Protogastrical regions divided by a longitudinal groove into two regions; cardiacal region however scarcely provided with a trace of a longitudinal groove. The antero-lateral margin is divided by four incisions into five little prominent rounded lobes, the anterior of which is the little prominent outer angle of the orbit and flows almost together with the second lobe. The legs agree entirely with the quoted figure.

Except by its smaller size our specimen thus wholly agrees with *Actaea rufopunctata* M. Edw.; it is of a beautiful purplish red colour, with white spots on the epigastrical regions, on the protogastrical regions and on the greater part of the posterior surface of the carapace; but the mesogastrical and cardiacal regions are again for the greater part of a purplish red.

I have found in the Museum still another *Actaea* from the Timor seas, which belongs most positively to our species and which differs from the Djeddah specimen only by the frontal lobes being a little emarginate at the outer side and by the longer hairs of the upper surface of the carapace. This species therefore appears to be a little variable.

4. *Actaea hirsutissima* Rupp.

There is a fine female specimen in the collection, with the carapace 20 mm. broad and 13 mm. long.

5. *Etisus maculatus* Heller.

Heller, l. c. pag. 332.

There are five young specimens of this species in the collection; it appears to me however to be very probable that this species may be identical with *Etisus laevimanus* Randall, which is found on the East coast of Africa throughout the whole Indo-Pacific Region as far as Japan, near the Sandwich isles and New-Caledonia. Our five specimens agree at least entirely with specimens of *Etisus*, which I believe to belong to *Etisus laevimanus* Randall. (the description of which species being not in my hands) and which are labelled in the Museum as coming from Padang, Xulla-Bessy, Timor and Nossy-Faly.

The largest of our five Djeddah specimens, a female, has the carapace 22 mm. broad; the arms of the nearly equal anterior legs are but little prominent beyond the carapace; this specimen is only ornamented with the large light spot, which covers the upper margin of the orbit as also a part of the upper surface of the carapace immediately behind the orbits and at their inner side. In another somewhat smaller specimen on the contrary the upper surface of the carapace is covered everywhere with numerous small spots, but the three other, still younger specimens are unspotted again.

6. *Chlorodius niger* (Forsk.) Rupp.

Ruppell, Beschr. und Abbild. etc., pag. 20.

Eight, for the greater part young specimens have been collected. The breadth of the carapace of the largest specimen (♀) is 20 mm. Mr. Alph. Milne Edwards has already shown this species to be very variable, which is also proved by specimens of the Leyden Museum. So in three specimens, collected by Wienecke in the Timor seas, the lateral teeth of the carapace are more rounded and tubercular, these teeth being much more acute in the Red Sea specimens; in the same manner the tubercles that are found behind the second and third tooth, are more prominent in the Djeddah, than in the Indian specimens.

The Museum contains also a young specimen from the Halmahera seas and a young sample from Java: the Java specimen was labelled *Cancer, Xantho, denticulatus* de Haan. This species, mentioned by Herklots (Symbolae carcinologicae, pag. 10), is therefore identical with *Chlorodius niger* Rupp. Mr. Hilgendorf (Baron von der Decken's Reise, pag. 74) also believes the *Chlorodius depressus* Heller to be identical with the species described by Mr. Ruppell, which I too think to be very probable.

7. *Phymodius obscurus* Lucas.

Alph. Milne Edwards, Nouv. Arch. du Mus. t. IX, pag. 220.

A single fine male *Phymodius* is in the collection, which I think identical with the above mentioned species, which as stated by Mr. Milne Edwards, occurs in the Red Sea. This species may be also identical with *Xantho dehaanii* Krauss = *Chlorodius dehaanii* Heller (Sitzungsber. Wiener Akad. Bd. 43, pag. 337).

The carapace is 16½ mm. broad and 11 mm. long. The whole surface of the carapace is divided into numerous regions, separated by tolerably deep grooves from one another, the surfaces of which being covered with many bright granules, which are equally large on the epigastrical lobes, as on the protogastrical lobes divided by a longitudinal groove into two parts, and on the hepatical regions, so that they may be observed with the naked eye, but they are much more minute on the mesogastrical and branchial regions. — The front has four lobes, the two median ones are broad and granular, though rounded, separated by a deep incision from one another and by a larger emargination from the two outer dentiform small lobes. Besides the external orbital angle, there are four lateral teeth on the lateral margins of the carapace, which are also granular and of which the two posterior are a little more acute than the two anterior ones. Of the anterior legs the left one is a little larger; the arms project but little beyond the lateral margins of the carapace, their upper margin is armed with some more or less acute tubercles. Also the upper surface of the wrist, and the upper and outer surface of the hands are covered with dark, more or less acute tubercles, those of the outer surface of the hands are placed in longitudinal rows, but the under and inner surfaces of the hands are smooth. The fingers are black, there are a few granules on the upper surface of the mobile finger near the articulation and the fingers are provided with many longitudinal grooves; the spoonlike excavated ends have a white margin. The ambulatory legs are covered with pinnate long hairs, the upper margin of the meropodites is armed with a row of sharp spines and the outer surface is granular. The abdomen has five segments.

8. *Trapezia rufopunctata* (Rupp.) Heller (nec Herbst).

Heller, l. c. pag. 350.

Four fine specimens of this species (2 ♂ and 2 ♀) were collected in the sea of Djeddah. This species may at first sight be distinguished by its colour, the distinctly developed frontal teeth, which are very similar to those of *Trap. cymodoce* Herbst, and by the distinct acute tooth on the lateral margin of the carapace. I have found in the Museum a fine *Trapezia*, presented by Mr. Milne Edwards and collected in the Nukahiwa seas; this specimen is labelled as *Trap. rufopunctata* Herbst and I believe it to be this species. But I think *Trap. rufopunctata* Herbst to be another than *Trap. rufopunctata* (Rupp.) Heller; to the latter a new name should be given. In the species, described by Herbst (Krabbe und Krebse, tab. 47) the four teeth of the front are all very acute, acuminate and separated by deep incisions, the external teeth are a little higher than the median teeth, directed outward with their points and with an almost vertical external lateral margin; the internal angles of the orbits are however also rounded and are less prominent than the frontal teeth. — Mr. Hilgendorf is wrong in believing these two species to be identical. — *Trap. rufopunctata* Rupp. (Heller) differs from *Trap. cymodoce* Herbst moreover by its hands being quite smooth and the upper margin of these hands not being hairy on its outer surface.

Breadth of carapace of an adult female specimen of *Trap. rufopunctata* (Rupp.) Heller, provided with eggs, 17 mm., whereas the Nukahiwa specimen of the true *rufopunctata* of Herbst has a carapace of 25 mm. broad.

9. *Trapezia guttata* Rupp.

Heller, l. c. pag. 351.

Two fine female specimens of this sharply characterized species were collected, which agree in all points with the description given by Mr. Heller; the breadth of the carapace is $9^1/_3$ mm.

10. *Trapezia digitalis* Latr.

Heller, l. c. pag. 352.

Six very beautiful specimens (3 ♂ and 3 ♀) are in the collection.

They agree entirely with the quoted description, but I will remark that the lateral margins of the carapace, though not being armed with a lateral tooth, are however provided with a very small scarcely visible incision, which is to be seen only by a magnifying glass, even in the adult specimens. — Our specimens are of a very dark blackbrown colour, but the lower part of the outer and inner surface of the hands, as also the fingers are of a light yellowish gray colour and the lower surface of the ambulatory legs are marked purplish red.

11. *Trapezia cymodoce* Herbst.

Synon.: *Trap. coerulea* (Rupp.) Heller.

Heller, l. c. pag. 348. — Miers, in: Annals and Mag. of Nat. Hist. for Nov. 1878, pag. 409.

There are sixteen fine specimens of this species (8 ♂ and 8 ♀) in the collection, which agree entirely with the description, given by Mr. Heller. As has been shown already by Mr. Miers in his note on some Crustacea from the Gulf of Akaba (l. c.), this species may be characterized by the *distinct lateral* tooth of the carapace, the *distinctly developed frontal teeth*, the *blunt* tubercle on the inner angle of the carpopodite of the anterior legs and *the upper part of the outer surface of the hands being covered with hairs*, which characteristics are not found in the other species. — The anterior margin of the arms is armed with 5—6 sharp serrate teeth; the arms project very much beyond the lateral margins of the carapace.

The Leyden Museum contains specimens of this species from the Red Sea, as also from the Indian seas (Amboina, Manipa, Xulla-Bessy), which entirely agree with each other. We have also received two specimens from New-Caledonia, presented by Alph. Milne Edwards under the name of *Trap. dentata* M'Leay (Nouv. Archiv. du Musée t. IX, pag. 261), which also agree completely with our species, so that *Trap. dentata* A. M. Edw. is identical with *Trap. cymodoce* Herbst. But *Trap. cymodoce* A. M. Edw. is identical with *Trap. ferruginea* Latr. Our species is positively the true *cymodoce* Herbst and the latter is identical with *Trap. coerulea* Rupp., 1°. because the teeth of the front project more or less in the several individuals, because the number of the teeth on the anterior margin of the arms varies from 5—7 and because the colour, at least of specimens preserved in spirits, is of no use in characterizing the species, some of our specimens having a bluish gray coloured carapace, others a reddish brown, others again a yellowish brown coloured. But always the tooth on the lateral margin of the carapace is sharp and acute, the upper part of the outer surface of the hands is hairy and the inner angle of the carpopodite has a blunt tubercle. It may also be remarked, that the description given by Gerstaecker of the species of Herbst is taken from the single original specimen, the frontal teeth of which are somewhat less prominent than in the typical specimens.

12. *Trapezia ferruginea* (Latr.) Heller.

Heller, l. c. pag. 349. — Miers, l. c. pag. 407.

Fifteen very fine specimens (12 ♀, 3 ♂) were collected in the Djeddah sea. This species has quite the facies of *Trap. cymodoce* Herbst, but may be recognized by the following characteristics. The lateral margins of the carapace are provided only with a very rudimentary blunt prominence, placed comparatively more forward than the acute lateral tooth of *cymodoce* and further the upper margin of the hands is more rounded, less cristate and their outer surface is quite smooth, not hairy as in the species described by Heller. For the rest the two species present a very great resemblance. The frontal teeth are more or less shaped as in *cymodoce*, but the median teeth are mostly a little broader and the external ones have an oblique outer lateral margin; the internal angles of the orbits are however less prominent than the front, are directed obliquely outwards and rounded. The upper part of the inner and outer surface of the hands, as also the upper surface of the wrist and of the arms are somewhat minutely punctate, but for the rest quite smooth; in some specimens the hands are of the same size, in others they are unequal, as in the adult male, the left hand of which is the larger. The arms project very much beyond the lateral margins of the carapace, and their anterior margins are armed with four or six small teeth, quite as in *Trap. cymodoce*; the inner angle of the carpopodite is blunt and the two or three last joints of the ambulatory legs are provided with some hairs. Our specimens preserved in spirits, are very diversely coloured; in some the carapace is of a bluish gray colour, in others of a reddish brown or reddish gray or sometimes of a ferrugineous colour.

The breadth of the carapace of an adult male is $13^1/_2$ mm., of the largest female specimen 18 mm.

The Museum received also a young female specimen, from New-Caledonia, presented by Mr. Alph. Milne Edwards under the name of *Trap. cymodoce* Herbst; it agrees however quite with our specimens, so that *Trap. cymodoce* A. Milne Edwards (Nouv. Arch. du Mus. t. IX, pag. 260) is identical with *Trap. ferruginea* Latr. The latter species has therefore as extensive a geographical distribution as *Trap. cymodoce* Herbst. I also presume *Trap. areolata* (var.

inermis) A. Milne Edwards to be only a diversely coloured, perhaps local variety of *Trap. ferruginea.*

13. *Tetralia cavimana* Heller.

Heller, l. c. pag. 353.

A fine female specimen of this species was found at Djeddah; it is characterized by the deep hairy groove on the outer surface of the larger hand. — The carapace is 17 m.m. broad and 14 m.m. long. — A. Milne Edwards presumes this species to be identical with *Tetralia glaberrima* Herbst.

14. *Thalamita prymna* Herbst.

Alph. Milne Edwards, Arch. du Mus. X, pag. 360.

There are 7 specimens in the collection. In all these specimens the fourth tooth of the lateral margins of the carapace is rudimentary and the fifth or last tooth a little smaller than the three anterior ones. In young specimens, which have a carapace of a breadth of less than 45 m.m., there is found no crest between the elevated ridge, found on the outer surface of the hands near the inferior margin and which proceeds to the tip of the immobile finger, and the spines of the upper surface; such a crest then appears gradually, so that specimens, in which the carapace is 65 m.m broad, show already a granulated crest on the middle of the outer surface of the hands. The basal joint of the external antennae is provided with a short high crest near the antennae, which is armed with two or three sharp spines.

15. *Thalamita savignyi* A. Milne Edw.

Thalamita admete, Audouin, Egypte, Crustacés, par Savigny, Pl. IV, fig. 4. — Alph. Milne Edwards, Archiv du Mus. X. pag. 357. —

A fine specimen was found at Djeddah, a female provided with eggs, having a carapace of 31 m.m. broad and 19 m.m. long. — Upper surface of the cephalothorax a little convex, the antero- and posterolateral parts being however deeper and more concave; the whole surface, but especially the said lateral parts are hairy and the elevated, minutely granulated lines of the surface are very prominent. The median very large frontal lobes have a somewhat emarginated anterior margin and the external lobes are placed a little before the median ones, with a nearly straight margin, almost as long as the latter. The five lateral teeth of the carapace are all acute, the fourth is a little shorter than the others. The crest of the basal joint of the external antennae is provided with a row of very short, tolerably sharp small teeth.

The upper margin of the arms is granular; the wrist is armed, besides with a very sharp spine at its inner angle, with three smaller spines on its upper surface, which is also provided with some granules and elevated lines and is a little hairy. The hands are of a nearly equal size, their upper surface is armed with six sharp spines, placed in two rows and alternating with one another, and the outer surface is provided, besides with the elevated granular ridge near the lower margin which proceeds upon the immobile finger, with two equally granular crests on its outer surface; between these crests some granules may be seen and the surface is hairy. The convex inner surface of the hands is granulated and hairy near its upper margin and provided with two rows of minute granules on the middle; the fingers are ornamented with a black spot before the pale tip. — The penultimate joint of the posterior ambulatory legs is armed with many very small teeth, the meropodites are provided with a hairy groove. — Our specimen is of a purplish red colour, with little yellow spots on the margins of the carapace, which is also of a paler colour at its under surface. —

16. *Thalamita poissoni* Aud.

Audouin, Egypte, Crustacés de Savigny, Pl. IV, fig. 3.

The collection contains three fine male specimens of this very rare species, which is so little known yet, that a new description may be allowed. As regards the general physiognomy and more especially the shape and the form of the carapace, our species wholly agrees with the Japanese specimens of *Thalamita arcuata* de Haan, which is identical with *Thalamita sima* M. Edw. after Mr. Alph. Milne Edwards. The upper surface is very convex, smooth, somewhat hairy anteriorly and at the lateral parts, minutely punctate, but deflexed towards the front and the lateral parts of the carapace; the median frontal lobes are still somewhat more prominent, being separated from one another by a scarcely visible median incision, the outer lobes are much smaller but straight and directed a little obliquely forward. The anterolateral margins are less arched, directed more straightly backward, though not so much as those of *Thal. admete* Herbst. The first lateral tooth or external orbital·angle, is blunt, as in *Thal. arcuata*; the second and third teeth are sharp and quite similar, the fourth tooth is always the smallest of all, in one specimen it is rudimentary, in another it is even absent on one side; the posterior tooth is sharp, directed forward and a little larger than the second or third. The elevated transverse ridges of the upper surface of the carapace are distinctly developed. The basal joint of the external antennae is provided with a smooth, very depressed crest; in *Thal. arcuata* that crest is higher, though also untoothed. The anterior legs are somewhat unequal, either the right or the left leg being the larger. The small hand resembles tolerably that of *Thal. arcuata*, but the large hand is higher and of a less slender shape; the arms are quite *smooth*, besides the somewhat granular upper margin, the anterior margin is armed with three more or less sharp teeth; the carpopodite is armed with an acute tooth at its inner angle, but its upper surface is only provided with some smooth elevated lines terminating in blunt prominences. The upper surface of the hands is provided with four spines, which are very sharp in the young specimen, but blunt in the two adult ones, two on the inner margin and two an the outer margin, one being placed near the articulation of the hand and the other between the two spines of the inner margin; the upper surface of the hands is somewhat hairy between these spines; the convex outer, lower and inner surfaces are quite *smooth*, besides a smooth, scarcely visible crest on the middle of the external surface and an equally smooth crest near the lower margin, that proceeds upon the index. The fingers are grooved and toothed on their inner margins. The male abdomen is formed by 5 joints. The meropodites of the posterior ambulatory legs are slightly grooved, with a sharp spine on the distal end of the lower margin and the lower margin of the penultimate joint is toothed.

Breadth of carapace of the largest specimen 33 mm, length 21 mm.

Though closely allied to *Thal. arcuata* de Haan = *sima* M. Edw., our species may be distinguished at first sight by its *quite smooth*, never granular, very convex hands.

17. *Neptunus pelagicus* L.

Heller, l. c. pag. 355.

A great number of young specimens are in the collection, which are all ornamented with the dark red spot on the inner surface of the hand before the articulation of the mobile finger, as described by Heller.

18. *Metopograpsus messor* Forsk.

Milne Edwards, Ann. Scienc. Nat. 1853, pag. 165.

A single specimen is in the collection. Which may be the difference between *Metopogr. messor* Forsk. and *Grapsus* (*Pachygrapsus*) *aethiopicus* Hilgendorf (Baron v. d. Decken's Reise, pag. 88, tab. 4 fig. 2). Our specimen at least, though entirely agreeing with the figure, positively belongs to *Metopogr. messor*, observed by Forskäl and described also by Heller as found in the Red Sea (and not in fresh water).

19. *Macrophthalmus verreauxi* M. Edw.

Milne Edwards, Annal. Scienc. Natur. 1852, p. 155,
pl. 4 fig. 25.

Two fine female specimens were collected in the Djeddah seas. Milne Edwards mentions this species as coming from New-Holland, so that it is distributed throughout the whole Indo-Pacific region, like so many other species.

The carapace is $19^1/_2$ mm. broad (the distance between the external orbital angles) and $11^1/_2$ mm. long; the upper surface of the carapace is convex and smooth, except the somewhat granular branchial regions.

The three lateral teeth are sharp, a little depressed and the first tooth is directed transversely outwards, but not foreward, (as in the quoted figure); the front is a little deflexed and has a very large, somewhat emarginate anterior margin. The legs are smooth, covered with long hairs on the margins and ornamented with variegated dark spots.

20. *Doto sulcatus* (Forsk.) de Haan.

There are ten fine specimens in the collection.

21. *Calappa tuberculata* Fabr.

A single specimen was collected; the species was already mentioned by Heller as found in the Red Sea.

22. *Pagurus varipes* Heller.

Heller, Sitzungsber. Wiener Akad. XLIV, pag. 244,
tab. I fig. 1, tab. II fig. 2 & 3.

A fine specimen was collected at Djeddah. This species is closely allied to the Indian *Pag. deformis* M. Edw. (Hist. Nat. Crust. II, pag. 222). Besides the differences of these species mentioned by Heller, I will still add the following: in *deformis* M. Edw. the cornea has half the size as the terminal joint of the eye-peduncles, but in *varipes* it measures only a third of the length of that joint. The two small triangular teeth on the anterior margin of the carapace are acuminate in *Pag. varipes*, but directed outward and more rounded in *Pag. deformis*. The terminal joint of the left third pair of legs is provided with an elevated crest on its outer surface, which does not occur in *Pag. deformis*. As regards the comparative length of the peduncle of the external antennae, the two species almost agree with each other: for also in *deformis* M. Edw. that peduncle is positively as long as, but not shorter than the eyes and in *varipes* it is indeed a little longer, but not so much as has been figured by Heller. The length of the cephalothorax of our specimen is almost 2 centim.

23. *Coenobita rugosa* M. Edw.

Numerous specimens were collected; they inhabit shells of the following genera: *Terebra*, *Harpa*, *Natica*, *Fusus*, *Triton*, *Nerita*, *Cassis*, *Murex*, *Turbo*, *Purpura*, and *Buccinum*.

24. *Palinurus penicillatus* Oliv.

A fine large specimen is in the collection.

The tubercles of the carapace are non-piliferous, but for the rest it agrees entirely with specimens from the Indian Archipelago, as regards the spines of the interantennal plate etc. But also another specimen in the Museum collection from Padang has the tubercles of the carapace nearly naked, so that I also think as Mr. Miers (l. c. pag. 410) *Pal. Ehrenbergii* Heller to be identical with *Pal. penicillatus* Oliv.

25. *Peneus canaliculatus* Oliv.

A single specimen was collected in the Djeddah seas.

26. *Peneus semisulcatus* de Haan.

Two young specimens were collected, which wholly agree with the Japanese types.

Leyden, Mai 1880.